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Vol. V NOVEMBER, 1940 No. 11

The American Horologist

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THE AMERICAN HOROLOGIST

Published monthly by Roberts Publishing Company, Denver, Colorado, in the interest of Horological and Jewelry Industry. To inculcate the principles of Fraternal and Commercial Advancement; to promote the welfare and enhance the betterment of the industry; to cultivate good fellowship and a higher degree of knowledge in Horology and Jewelry industry.

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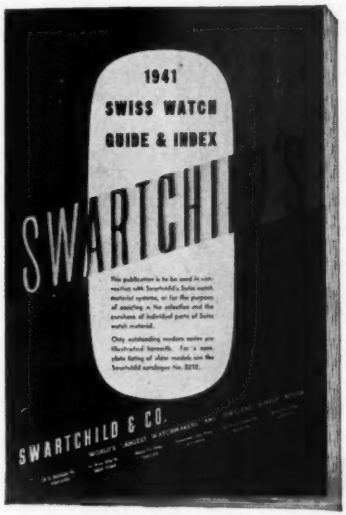

YOUR 1941 SWISS WATCH GUIDE and INDEX

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This 24-page publication, which is being sent to you with the compliments of Swartchild & Co., will be an invaluable aid to your watch repairing. It contains illustrations of a carefully selected group of standard Swiss movements, including the latest and most modern, for which you frequently need parts. It not only contains an illustration of each of these movements themselves, but also an illustration of each setting bridge, each manufacturer's trade mark, and the proper stock number of mainspring to order for each movement. In addition, there are several pages of what we believe to be the most complete Swiss Watch Name list ever compiled.

With this book, watch material for thousands of differently named Swiss watches can be identified without any effort. Watch for your copy which you will find a boon to use daily—and if more are required in your shop, please feel free to write for them.

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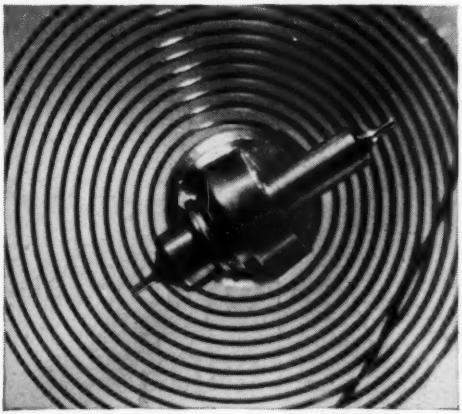

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Elgin, Illinois

Copr. 1940 by Elgin National Watch Company, Elgin, Ill.

MOTOR OIL CO. MISREPRESENTS TO PUBLIC

This Oil Company Exploits the Finest Known Industry To Advance Its Own Products

When any company or individual stoops so low as to placard a city and nation with signs and ads—injuring others—then it's time for those injured to speak and expose such un-American acts.

This company, in order to promote its unspeakable untrue propaganda, employed a foreign agency in a foreign country to approve their prepared lies, which to the company and its officials afforded a possible alibi.

This company, in seeking its basis of propaganda, says they sent a sample of its Golden Motor Oil to Switzerland for an analysis as to watch oil suitability, and if found to be so, they would, and did, purchase 30,000 of their watches—and they force their employees to buy them.

It is strange that such concerns will go to these lengths to besmirch, in our opinion, a government's research ability, such as ours, by utilizing foreign chemical analysis.

Manufacturers, of fine or popular watches in Switzerland, would hang their heads in shame to think their product, and the country in which produced, bears any connection with such articles, for they know how untrue and misleading as well as detrimental these statements are. We know that manufacturers of fine watch oils, both abroad and in America, will back up our statements.

The American maunfacturers of fine oils, watches, clocks, and precision instruments, which include every known devise used by surgery, government, etc., are entirely wrong according to this campany's claims.

We, looking at the issue from a patriotic and progressive standpoint, claim this company is practicing the worst type of sabotage and demoralization of government, and industry, as well as private fine and precision instrument industries, which to-day are the very backbone of our national life.

We openly condemn this company's misleading propaganda as un-American and grossly injurious to the branches of our industries using fine oils for precision mechanical devices.

This information together with additional claims including our resentment of "Buick' Motor' Company's statements in open press "A fine wrist watch is rougher than your new Buick engine" has been filed with the Federal Trade Commission and public releases sent to United Press and Associated Press and all legitimate trade presses including other industries.

Let's Stop Misrepresentation

We note in the October 10 issues of all daily papers, as interviewed by the roving reporter, Ernest Pyle, who perhaps feels that he was justified in accepting the statement of an Indiana watchmaker, relative to the amount of work that should and could be turned out by a legitimate workman.

With the many complaints received, in this office, from throughout the United States relative to this story, we launched our official complaint with this roving reporter, Ernest Pyle, and hope that we shall be given an opportunity to see a retraction of these untruths, that a man can turn out the amount of work, so stated in this article, legitimately.

Rivett Lathe, 60 chucks, sliderest, jeweling caliper, face plate, bezel chuck, & 4 jawed chuck.
Slide rest for 1x2 Moosley
Slide-rest for No. 2 Moosley
W. W. Lathe with face plate & 25 chucks
Engraving Block
Boley No. 2 Mosley Lathe & 25 chucks
Box 341 The American Horologist

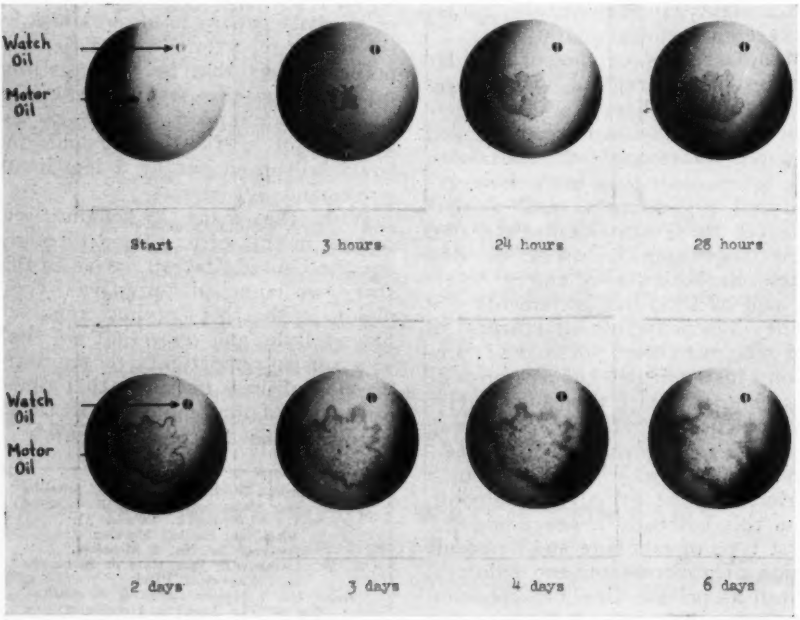
Motor Oil vs. Watch Oil

FRANK D. URIE

Supt. Research & Inspection Elgin National Watch Company

The accompanying photographs show the spreading characteristics of two oils, one a well known motor oil nationally advertised as good enough for fine watches, and the other a high grade watch oil. At the start of the test a drop of each oil was placed on a highly polished block of steel. The camera was mounted vertically over this block and photographs, magnified 2 X, were taken at various intervals of time. The upper drop on the photographs is watch oil, which maintained its globular shape throughout the test with no evidence of spreading. The lower drop is motor oil, which started to spread as soon as it touched the steel block and before the camera shutter could be snapped to take the first picture. At the end of three hours the spreading was very apparent, and at the end of six days, the original drop of motor oil was entirely diffused.

Any oil to be good enough for fine watches must possess high anti-spread characteristics. The reason for this is of course self evident. The consumer never checks or adds oil to his watch; only when he takes it to his jeweler for cleaning is the watch oiled. Moreover, the oil which the jeweler applies to the watch must then last a year or more until the next cleaning. If this oil spreads rapidly it will disappear from the watch bearings in a few days, with the result that the watch will either stop, or perform irregularly due to excessive wear on the bearings, causing permanent damage to the watch mechanism.



A Practical Crystal Former

By Stanley Prokop

Due to the large outlay of money that it takes to stock every fairly commonly used size of glass crystal that one must have, in both the round and fancy shapes, one must have approximately double the amount of capital invested if a usable supply of unbreakables are kept on hand. With the thought of keeping down the cost and also the loss of out-of-date material the following device was developed, which can be duplicated by any watchmaker in a half hour's time for a cost of less than fifty cents, excluding the cost of crystal material.

As can be seen in the illustration the main part of the crystal former is made from a machinests oil can, of the tall variety, which has had the spout cut off so that it has a quarter of an inch opening. A regular flat, three quarters inch flat lamp wich is then passed up from the bottom. (This arrangement also makes an inexpensive but affective alcohol lamp).

Next a copper or brass disk of 2½ or 3 inches diameter and about 20 Ga., or .8 MM, thickness is taken for the Heat Plate. This plate has a hole of about 1.8 MM diameter in its center whose purpose will be explained later. A circle whose diameter is about ½ inch smaller than the diameter of the top of the screwed in spout section of the oil can, is laid out on the Heat Plate from the center. On this circle are drilled four holes of 2.5 MM diameter.

Four ten penny nails are now taken and the points cut off so that they are about ⅞ of an inch longer than the remaining amount of spout. This end is turned down so that it will just pass through the outer holes in the Heat Plate and leave enough projecting to be riveted over, which is now done.

The heads of the nails are now soldered to the top of the oil can as illustrated.

Our Crystal Former is now complete except for cutting in two a soft sponge rubber ball of about 2 inches diameter.

The oil can is now filled about ¼ full of alcohol, and at this time it is a good idea to punch a very small hole in the sloping shoulder of the can for a vent as the alcohol may vaporize quite rapidly due to the fact that it is in a warm metal container. This is why it is not good policy to fill it over quarter full.

A cap for the spout to keep the alcohol from evaporating, can be made by soldering shut one end of a short piece of copper tubing that fits snugly over the spout.

Before we can use the former it is necessary to have something to make our crystals out of. All material houses carry in stock strips of un-

READ THIS . . . . . .

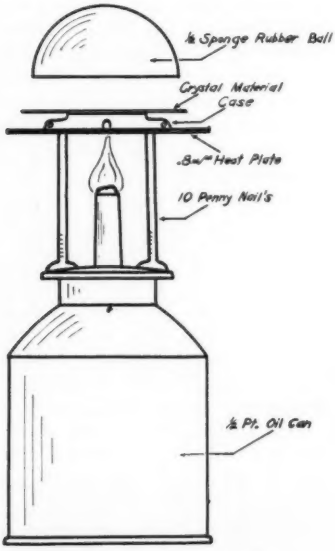
which was unsolicited. It came from H. C. Carpenter, Watch Inspector, Russellville, Arkansas.

"It might interest you to know that I have used your Watch and Clock Oil since 1912 *and it has stood the test. It is the best oil I have ever used. I am watch inspector and we re-clean every* 18 *months and I find the oil in lots of cases still in good shape after an* 18 *months run."*

All Material Jobbers Sell Fulcrum Oil

FULCRUM OIL COMPANY FRANKLIN, PA.

breakable material to be used with their electric Former's. This comes in two thicknesses of 25 and 30 Ga. The 25 Ga. has been found to be the most satisfactory as it is heavier and less liable to come out of the watch.



UNBREAKABLE CRYSTAL FORMER

We are now ready to make our first crystal. The bezel is now laid on the Heat Plate, centerly over the center hole in the Plate and a piece of the crystal material, about ¼ of an inch longer each way than the size of the desired crystal, laid on top. The lamp is now lighted and the flame adjusted so that the point comes just to the bottom of the Heat Plate. The material is to be tested from time to time with the eraser end of a lead pencil to see if it is becoming soft. When quite soft, but before the grain of the material has shown up, the flat side of the rubber ball is placed on top, and with the thumb in the center of the ball, it is pressed down with a firm pressure. The lamp is blown out at this time. It is necessary to keep the pressure applied for about 30 seconds, after which the ball and material may be removed and allowed to cool.

If it has been found that the dome of the crystal is not high enough it may be placed back on the bezel and reheated, care being taken to get it back on the bezel properly.

The purpose of the hole in the center of the Heat Plate is to allow the right amount of heat to come through the plate and heat the material that isn't touching the bezel. It is a good idea to start with a small hole and broach it out until the size is found that heats up the center of the material the same as the bezel. 1.8 MM being approximately correct. If the hole is too large the material may catch on fire or the dome have a lump in it's center.

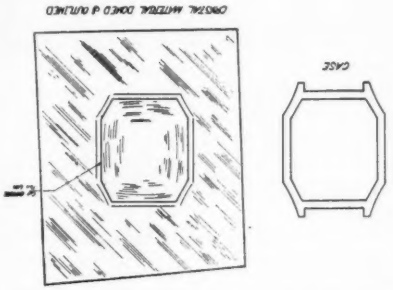
The next step is to cut the crystal out of the material. This is done by scratching, around the outline with a knife blade or other sharp instrument, then breaking the superfluous material away. The crystal should be cut out with care just OUTSIDE of the INSIDE impression left by the case. It can readily be seen where to cut, with a loup.

The edges are now beveled with a medium cut file and the crystal fitted to the bezel so that it is as tight a fit as can be gotten in. If it humps up on one side it is a sign that it is pinched in on one side tighter than the other and must be remedied or the crystal will soon leak dust or come out. The last operation is to flatten the bottom on a piece of 00 emery paper so that is sets firmly against the bottom of the bezel.

All crystals should be cemented in, regardless how well they fit.

A word to the wise is sufficient. Do not guarantee them against coming out for when sufficient pressure is applied to any material that doesn't

break it must expand or give in some shape or form, so when the crystal is struck a sharp blow it is apt to snap out.



The Heating Plate on the Crystal Former also makes a very good tempering plate for small watch parts, springs, etc.

DONT'S

Don't get the material too hot.

Don't go off and do something else or an edge of it will touch the heating plate while doming and catch on fire.

Don't go off and dos omething else while the material is heating for it may catch on fire and ruin the bezel.

Don't fail to support the center of cases that have the lugs extending below the edges of the case, otherwise it will be bent in doming. A good way to do this is to lay a short piece of brass wire, of correct thickness between the heating plate and case.

Don't try to make curved crystals, because it won't work.

Don't get discouraged if the first one isn't perfect. You didn't learn watchmaking in a day.

Repairing Cuckoo Clock Escapement

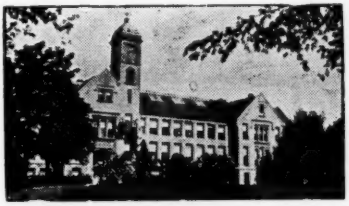
By W. H. Samelius, Director
Elgin Watchmakers College
Elgin, Ill.

We find two styles of escapements employed in the cuckoo clock, mostly the regular recoil and verge. (Fig. No. 1) and occasionally the detent and single impulse. (Fig. No. 2).

When repiaring the regular recoil escapement, see that the holes for the escape pivots and the pallet arbor pivots are nicely burnished and holes in plates are properly closed or bushed.

Any worn grooves in the face of the pallet must be removed by first using an oilstone slip and finally polishing the surface with a fine emery stick, putting on a gloss surface with diamantine and a boxwood slip. When removing any pit marks or grooves, care must be taken to remove an equal amount of material across the entire surface of the pallets so as not to change the original angles. See Fig. 4-5.

"The Pathway to Success"



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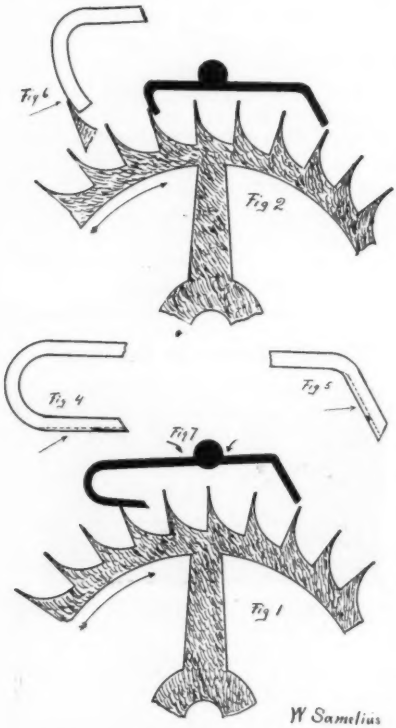
Many pallets are ruined by carelessness or want of understanding why pallets are made with a given angle and any deviation from such may cause the clock to stop.



When adjusting a recoil escapement, set the verge as close as possible in order to get all possible impulse in order to give the pendulum the maximum motion, especially where the pendulum is not protected from drafts such as cuckoo clock pendulums. The recoil escapement gives an impulse for each swing of the pendulum. With the detent and single impulse pallet, the impulse is only given the pendulum in one direction from the discharge pallet. The receiving pallet face is cut concentric from pallet center. When tooth comes to rest on the receiving pallet, it remains dead, similar to the Graham Dead Beat Escapement.

Care must be taken when repairing the detent and single impulse escapement that pivots are burnished, holes bushed, faces of pallet highly finished and the escapement adjusted very closely. This style of escapement is subject to stoppage if not in perfect beat. See that tooth reseting on receiving pallet is properly formed so the tip of tooth is in contact only on locking face of detent pallet. See Fig. 6.

Often the front of the tooth is worn to a flat surface, such conditions create sufficient friction to stop the clock. If any bending of verge should be necessary in order to bring about even drops, the verge is glass hard on the impulse ends, however, the pallet itself is softened out from the body, or where it is attached to the arbor, and may be bent without danger of breakage. Fig. 7.

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FORMULA FOR fine WATCHMAKING

Know your watches! Here are five of the most popular Hamilton movements pictured and described for your information. Know them—and when you repair them—remember that only genuine Hamilton materials will protect and preserve that fine watch precision which is the heritage of every Hamilton.

Grade 911—22/0 size. 17 ruby and sapphire jewels. Elinvar hairspring and monometallic balance wheel. Solid nickel-silver plate and bridges, rhodium plated, finely damaskeened. Large escapement, steel escape wheel, double roller. This movement is available in platinum (diamond), 14K gold and gold-filled cases at prices ranging from $50 upward.

Grade 721—21/0 size. 17 ruby jewels. Elinvar hairspring and monometallic balance wheel. Solid nickel-silver plate and bridges. Steel escape wheel, double roller, new top grooved balance staff. Available in 14K gold, 14K and 10K gold-filled at prices ranging from $40 to $55.

Grade 997—20/0 size. 17 ruby and sapphire jewels. Elinvar hairspring and monometallic balance wheel. Solid nickel-silver plate and bridges, rhodium plated, nicely damaskeened. Steel escape wheel, improved friction jeweling, double roller escapement. This movement is cased in 10K white or natural gold-filled. Priced at $40 and $42.50.

Grade 980—14/0 size. 17 ruby and sapphire jewels. Elinvar hairspring, monometallic balance wheel. Extra heavy pillar plate, solid nickel-silver plate and bridges, rhodium plated, soft line Butler finish. Scientifically engineered escapement, improved friction jeweling. Cased in 10K gold-filled. With applied gold numeral dial only, $45.

Grade 982—14/0 size. 19 ruby and sapphire jewels. Elinvar hairspring and monometallic balance wheel. Extra heavy pillar plate, solid nickel-silver plate and bridges, rhodium plated, finely damaskeened. Scientifically designed escapement, improved friction jeweling. Cased in platinum, 14K gold and 14K gold-filled, $52.50 to $175.

HAMILTON WATCH CO. **Lancaster, Pa.**

A Method of Timing

By H. F. Hoyt, Jr.

Should the problems of the horologist be divided into three principal parts, they likely would be scientific repairing, rapid efficient timing and precision adjustment.

Let us consider the second of these. Suppose we have a watch being timed that does not carry a second hand and a mechanical timing device is not available.

We can resort to a method of counting the ticks. The equipment required being only an accurate watch or clock with seconds indicator and plenty of concentrated effort and attention. With small wrist watches some type of amplifier may be necessary to make the ticks more audible but to hold the smaller movements against the ear with the aid of an ordinary metal material box may be quite satisfactory. Placing the watch to be tested against the ear we make the count in close check with the second hand on the master watch.

To count the ticks we mean the offbeats or every other beat. The average watch with an 18,000 train has 300 beats or 150 off-beats per minute.

If we begin the count of the watch being tested with the second hand of the master watch at sixty then at the end of the 150 count the second hand should have made a complete revolution and at that moment should be covering the sixty mark or starting point. If the count finish before or after the hand has reached the starting point the watch under test is fast or slow in comparison to the master watch.

Suppose we count the off-beats up to ten and repeat each ten offbeats unitl the second hand has made a complete revolution. At that instant the count of one should find the hand at the identical spot on the dial as at the beginning of the count.

If after counting five minutes the second hand of the master watch has made five revolutions and at the instant of the starting point the count is three in place of one we have a gain of 2 offbeats or 4 beats. With five beats to a second the rate is approximately one second gain in five minutes or twelve per hour.

Suppose after a ten minute test the hand reaches the starting point on the eight count. The watch is slow by three off-beats or six beats, a losing rate of one and one fifth seconds in ten minutes or seven and one fifth seconds per hour.

A more simple way to make the test is to count to five off-beats, repeating and making the comparison every twenty seconds if desired.

For example if the test is begun with the seconds hand of the master watch at that instant just passing over the sixty mark. As the hand passes over the twenty, the forty and the sixty again, the count at each of these points should be one or on the first off beat.

If you have difficulty counting the off beats I suggest you take a sixteen or eighteen size watch and place the balance slightly out of beat. Then the alternate beats can be more easily discernable and the ear will be trained to catch the count.

The beats however should be so similar as to blend in one full beat and if one is more prominent that the other we have a sure sign of unequal impulse, balance off beat, out of poise or some similar error.

It should be remembered that the agitation given the balance when placing it in position against the ear may give a false rating as time must be given for the balance to settle down to normal velocity before beginning the count.

British Jewelers Purchase Squadron Fighters

In a recent cablegram received from Arthur Tremayne, Editor of

● You keep *both halves* when you sell Gruen watches, for these precision timepieces are sold only by Gruen jewelers—at nationally advertised Gruen prices! There is no price cutting, nor are you in competition with price-cutting methods! And to help you sell . . . to boost your profits . . . Gruen provides you with tested sales helps—"custom-built" newspaper ads for your own use, hit radio shows to be broadcast over your local stations, eye-catching, buy-appeal counter cards and window displays. Use these helps . . . get your share of the profits! The Gruen Watch Company, Time Hill, Cincinnati, O., U. S. A. In Canada, Toronto, Ont.

Aggressive advertisements in national magazines read by your customers.

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Colorful displays for your windows and attractive signs for your store.

Direct mailpieces for your customers—your own radio shows for your local stations.

GRUEN

THE PRECISION WATCH

★

Copyright 1940, The Gruen Watch Co.

GIFTS FROM YOUR JEWELER ARE GIFTS AT THEIR BEST

N. A. G. Press, London, England, we learn that the British jewelers have created a "spit-fire fund" for buying squadron fighters.

The telegram reads as follows: "Would State jewelers back British jewelers spit-fire fund buy Squadron Fighters? Is organization U. S. Jewelers Spit-fire collection possible? Would all branches industry help? Please advise best methods promotion. British Jewelers Collection aims quarter million dollars."

Any watchmaker or jeweler in America, who wishes to contribute to this fund, may forward their donations direct to THE AMERICAN HOROLOGIST, who in turn will forward to Mr. Tremayne in London, England.

Southwestern Minnesota Watchmakers Guild

Held their regular meeting October 12 at Tracy, Minnesota.

Mr. Will Nelson, State Representative, pledged his support to their Licensing Law, and talked extensively on the subject.

Next annual meeting and election of officers will be held the first Sunday in December at Redwood Falls.

JAMES MARCOTTE,
Publicity Director.

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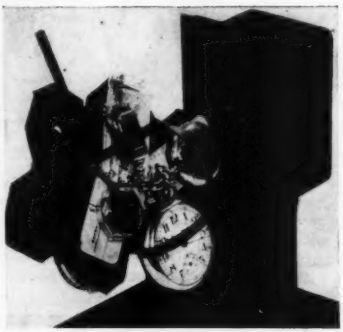

1. Holds 8 watches, tags, and bands.
2. Machine is intended to catch position errors. Watch actually passes through 9,000 positions in 2½ hours.
3. 3 watt, self starting synchronous motor, 12c a month for operation.
4. Price $9.75 net; postage added or $2.00 down; $2.00 a month for four months. Plus Postage.

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All Crowns Are 1/10-14K Gold Filled

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The New four color crown assortment contains 72 of the best selling crowns. There are 36 yellow, 12 white, 12 new color yellow and 12 rose crowns, and all are 1/10-14K Gold Filled. Ask your jobbers for the four color crown assortment.

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- **Automatic Reversing**
  reverses rotation every five seconds and eliminates possibility of vortex forming in the solution. Basket and watch parts are covered with solution at all times. No other machine has this *automatic* feature!
- **Control Switch**
  allows you to shut off "Automatic Reversing" should you at any time feel the need of working without it.
- **Turntable Top With Jars**
  of solution and Drier keeps work in front of you all the time.
- **Telescopic Steel Column**
  "Finger Tip Control". Raises automatically when released from jar.
- **Automatic Signal Light**
  works in conjunction with Drier to show when it is in operation.
- **Square Jars**
  plus automatic reversing are a double protection against vortex forming in the basket.

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Ball Bearing Motor with Controlled Speed.

Motor Switch and Rheostat Control conveniently located on base.

Extra Heavy Vitreous Enamel Coated Jar Tops with felt inner lining to keep solutions from evaporating.

Black Wrinkle Finish with Chromium trim.

4 Jars and Drier. 1—Cleaner. 2—1st Rinse. 3—2nd Rinse. 4—Final Rinse. 5—Electric Drier.

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The Peerless "Automatic Reversing" Watch Cleaning Machine is the only machine that assures its user of a continuous flow of solution around watch parts in the basket; it eliminates, by its "Automatic Reversing" feature, air pockets that are bound to develop in any cleaning machine where the basket rotates in one direction continuously. The Peerless basket, rotating to the right for five seconds, then automatically reversing and rotating to the left for the next five, breaks up all the air pockets that might form.

PATENTS APPLIED FOR

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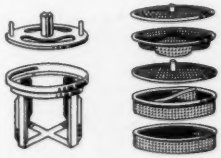
"AUTOMATIC REVERSING"
WATCH CLEANING MACHINE

With Specially Designed All Monel Metal Basket



Basket is composed of three separate Monel metal wire screen sections (partitioned for different sizes of watch parts) fitting on top of each other and all into a skeleton frame. Definitely the finest added feature, as the solution passes through only one layer of wire screen rather than three of four where the sections fit into one another.

This divided basket allows you to clean more than one watch at one time.

The skeleton frame is constructed with eight louvres or fins which, when basket rotates, form a suction that draws the solution through every section of the basket.

No. 36116E. Peerless "Automatic Reversing" Watch Cleaning Machine complete with cord and plug ready to operate on A.C. Current..... **$57.50**

No. AH36117. Peerless "Manual Control Reversing" Watch Cleaning Machine complete with cord and plug for operating on D.C. Current..... **$55.00**

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AERONAUTICAL INSTRUMENT SERVICE

Aircraft Instruments

EDITOR'S NOTE—Aeronautical Instrument Service is a subject untouched by publications in the Horological field, or in fact by any publication. In September, 1938, THE AMERICAN HOROLOGIST inaugurated such an educational service via prepared illustrated lectures to be used by U. H. A. A. organizations for the purpose of broadening our members' scope of knowledge in this field, which offered additional remuneration to those far-sighted enough to avail themselves of such knowledge.

ARTICLE No. 14

(Continued from October Issue)

Type B.—Type B is an older model than the type B-3 and has but one compensating chamber. This compass is shown is Figure 46. At the top of the bowl just under the compensating chamber there is an air trap in which the air is compressed by the expansion o fthe liquid. This provides a means of relieving any pressure due to the expansion and contraction

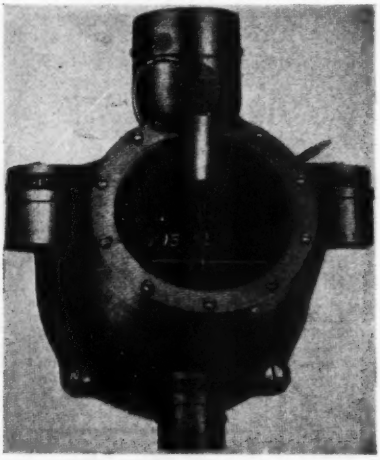

Fig. 46—Type B. compass

of the liquid when the compass is supjected to various temperatures. Internal pressures occuring from this source would force the sealed joints to loosen and cause leakage, and in extreme cases would probably break the glass. If the type B and type B-3 are properly filled, a large bubble will be emitted from the expansion chamber when they are tipped backward to a **face-up** position.

Type A.—Type A, shown in Figure 47, is similar in construction to types B and B-3, except that it is smaller, has lower visibility, has only one compensating chamber (closer to the card than in the type B), and the

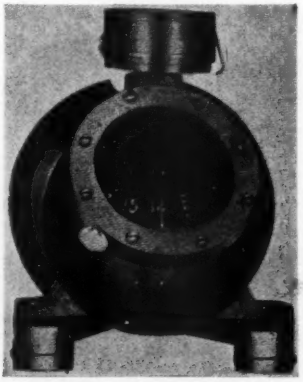

Fig. 47—Type A compass

bowl is more nearly spherical. Thus, the liquid is less turbulent when the bowl is rotated. Poor illumination makes it difficult to read this compass.

Navy type I (Sperry Mk. XVI, or Pioneer)—See Figure 48. This type of compass is a combination of the flat card and vertical card styles. It may be read either from the rear side or from the top. It is so constructed that it may be mounted either on a vertical board or on a flat deck. It is rather large and, on account of its cylindrical bowl, the card is sensitive to rolling and pitching. Use of this

instrument should be confined to the more stable aircraft.

Because these instruments have a great propensity for losing their liquid in service, they are quite

Fig. 48—Navy type I compass

troublesome. The lighting is very poor, especially when the compass is mounted where daylight comes from any or all sides; for example, on the top of the cowling, where high lights and reflections make the card unreadable under certain conditions.

Aperiodic types — The aperiodic compasses were developed in England and are in general use in Europe. They have been introdced into the United States and have been adopted by the Air Corps for airships. The advantages offered by the aperiodic compass are not considered available to the military airplane on account of limited space available for mounting the compass. Also the high damping is not thoroughly appreciated by the American airplane pilot, it being generally believed that the short-period (low damped) compass used in combination with a bank-and-turn indicator is better.

The aperiodic compass is fundamentally similar to conventional magnetic compass in having a pendulous system of magnets attached to a card. In some models the card is omitted, the reading being obtained by means of a grid of parallel sighting wires attached to an azimuth scale to be rotated about the vertical axis of the bowl and set by reference to a lubber line. The pendulous magnetic system is provided with a series

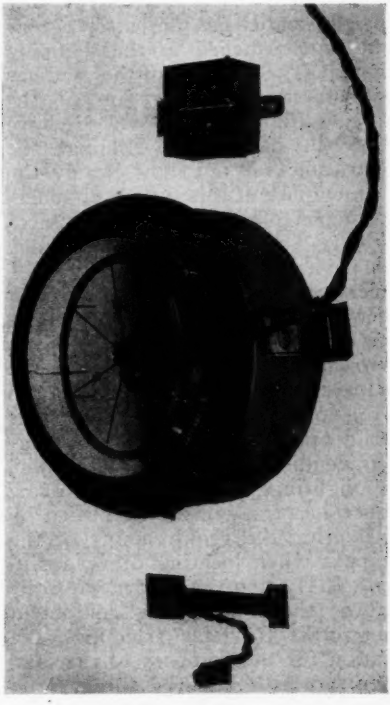

Fig. 49—Aperiodic compass

of radial wires or "filaments" which serve to produce a very light structure and to enhance the damping without creating eddies or swirls of a general nature, such as often occur in ordinary compasses, where the card and spider structure usually present longer resistant surface to its movement in the liquid. The damping of the "aperiodic" and "dead-beat" compasses is proportioned to the torque exercised by the card magnets in the earth's field, so that after a disturbance the card will not oscillate in seeking its point of balance with reference to the gravitational

and magnetic forces acting upon it.

Figure 49 shows a typical compass of this type with its compensation magnet holders that are intended to be mounted directly below the compass in accordance with instructions supplied with each instrument. The type illustrated has the card, a very light one, attached to the damping filament. The addition of the card has necessitated the elongation of the damping filaments, the added length being bent downward. Although the illustration does not show clearly, the window glass of this type is of spherical shape to afford longer range of visibility, a very useful magnification, and better illumination.

Location of compasses.—On aircraft when it becomes necessary to relocate the compass for special projects or to install new equipment near the compass, the choice of the location of the compass must be given serious consideration as to its visibility, magnetic conditions, exposure, vibration, and lighting. The selection of a proper location will be simplified by considering the requirements of the compass when locating other equipment. It is often the tendency on the part of those arranging equipment on aircraft to defer selection of a location for the compass to the last, when, not infrequently, there is no magnetically suitable place left for the compass.

First of all the compass must be where the pilot may look directly into it without shifting to a position that will hinder his flying or comfort. Further than this it is impracticable to set down any fixed rules for locating the compass since the disturbing effect of other magnetic equipment depends upon the composition of so many different conditions. It should be kept in mind that a reasonable amount of permanent magnetism can be compensated for but variable sources of deviation must be kept far enough from the compass that their effect is negligible.

The following subparaghaphs provide lists of the most common causes of deviation, and where the data are known their minimum distance from the compass is given.

Variable causes.

(a) Iron (untempered steel).—Deviation varies with the heading of the aircraft and with the amount and character of vibration. Terne and tin plate fuel tanks and structural members fall in this class. The vibration of fuel tanks varies with their fullness and with revolutions per minute of the engine, and the compass should be at least 15 inches from them and at least 6 inches from steel structural members. Aluminum or brass fuel tanks do not affect the compass.

(b) Electric wires.—The magnetic field around electric wires varies in strength with the amount of current carried and in polarity with the direction of current. With the exceptions noted below all single-current bearing wires should be kept at least 24 inches from the compass. When the two wires of a circuit are close together (preferably twisted) their magnetic field is very much localized and may be brought as close as 10 inches from the compass.

(c) Guns.—Deviation caused by the guns varies from their firing so that the compass must be kept at least 12 inches from them.

(d) Voltage regulators, automatic circuit breakers, etc.—The field of this type of equipment is often very great and varies with the rate of charge or discharge of current and must be kept at least 24 inches from the compass.

(e) Movable controls.—The deviation caused by any steel or

iron control handles, rods, stirrups, etc., varies with their movement. Their minimum distance from the compass will vary with their dimensions and range of movement and should be determined by trial unless more than 20 inches from the compass. In many cases the material for such controls could be a nonferrous metal which would have no effect on the compass.

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AEROPLANE INSTRUMENTS

E. Molloy, Editor

1940 **$2.00**

140 Illustrations **Cloth Bound** **132 Pages**

One of the outstanding features of this book is the very detailed treatment which has been given to the installation and maintenance of the Sperry Gyro-pilot. The robot-like precisions of this equipment depends ultimately on the perfect adjustment of its component parts.

The Sperry Artificial Horizon and the Sperry Directional Gyro, and the various types of instruments manufactured by Smith's Aircraft Instruments, have also received full treatment from the severely practical aspects of installation, operation and maintenance.

In all cases valuable hints have been given to facilitate the rapid tracing of faults which may have developed under service conditions.

CONTENTS

PREFACE

THE SPERRY GYROPILOT FOR AEROPLANES
The Gyroscope—Directional Gyro Control Unit—Using the Gyropilot—Speed-control Valve setting—Servicing the Gyropilot—Servo Oil Lines.

THE SPERRY ARTIFICIAL HORIZON AND DIRECTIONAL GYRO
The Instrument Flying Problem—The Directional Gyro and Radio Beacon—The Sperry-Horizon—Installation Layout—Installing the Venturi—Connecting the Instruments—Questions and Answers.

NOTES ON THE INSTALLATION AND MAINTENANCE OF SMITH'S AIRCRAFT INSTRUMENTS
Electrical Fuel Contents Gauge—Installation—Wiring—Maintenance—Electrical Data—Fuel Pressure Gauge—Airspeed Indicator—Sensitive Altimeter—Electrically Heated Pressure Heads—Artificial Horizon—Boost Gauge—Pressure Warning Units—Undercarriage Position Indicator—Atmospheric Pressure Gauge.

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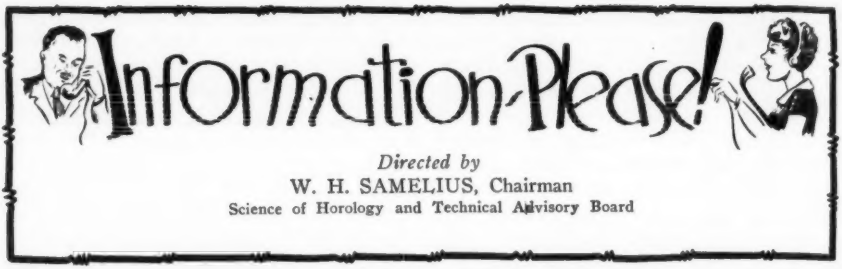


Directed by
W. H. SAMELIUS, Chairman
Science of Horology and Technical Advisory Board

A.H.G.—Of late years, I notice all new watches have steel escape wheels. What advantage has the steel wheel over the brass?

Answer—Watches were formerally made with brass wheels and garnet pallets and jewels, as well as sapphires. When both were in use, it was observed that the brass escape wheel would work well with garnet pallet stones but would cut with sapphire pallet stones and the steel wheels became rapidly worn with garnet pallets and did not show much wear with sapphire pallets. The steel wheel can be made much lighter and can be hardened and ground so as to give a very narrow polished surface on the teeth, offering less friction and resistance. Less inertia in a steel wheel. For these reasons, steel wheels have entirely replaced the brass wheel.

W.R.C.—I have frequently had considerable trouble in getting a clear musical tone after repairing a strike clock. What can I do to get a clear tone as the clock originally had when leaving the factory?

Answer—Gongs are made by coiling wire on an arbor in a lathe. They are heated to a dull red and hardened in oil, after which they are drawn to a blue. After the tempering is done, **if** they are bent beyond the point where they will spring back in place, the value of the tone is destroyed. It is always advisable and cheaper to bend the hammer instead of trying to bend the gong. Oiling the leather face of the hammer will soften the tone and make the clock strike more musical.

R.J.B.—When repairing many foreign watches, I find the regulating pins wide apart, while in the American watches, the regulating pins are close. Why this variation?

Answer—In the cheap imported watches, the hairspring is so fitted that very often they cannot be regulated or the regulation is beyond control of the regulator and rather than make the proper alterations or changes by lengthening or shortening the hairspring or by altering the weights of the balance to bring the watch to time, they will spread the reg pins, however, these watches are not supposed to keep accurate time in the various positions and the spreading of pins is resorted to.

Wide pins will cause the watch to run slower pendant up, dial up and dial down. In a properly adjusted watch, the pins should grasp the outer coil of the spring closely but without distorting the curve. This is one of the first things a watch adjuster examines to see that there is no motion of the spring between the pins.

O.L.—I have an old American clock with wooden movement which I cannot regulate. I have tried to make it run slower, lengthening the pendulum to the limit, added weight, lightened the running weight and it still runs fast.

Answer—You many find there is a wheel loose on it's arbor somewhere between the center wheel and the escape wheel. A little slipping at such a point would cause the clock

to gain, regardless of what you do to the pendulum. In most wooden clock movements, the chances are that if such a condition exists, it would be the escape wheel.

F.R.—I recently purchased a book on hairspringing and adjusting and I notice nearly all the methods inform you to first center the spring. How is a hairspring centered in a watch?

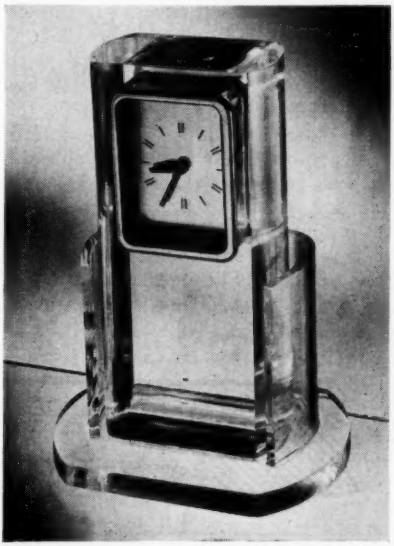
Answer—If you use genuine material, you will find very little centering necessary as the springs are correctly coiled at the factory. If you desire to center a spring, the quickest way to do it is to remove it from the balance, remove the cock and attach the stud to the cock. With the hole jewel as a guide, you can bend the spring with a tweezers until the collect coincides perfectly with the jewel hole. Be careful not to bend the spring at the point where you have circled it to fit the arc of the reg pins.

Etherial Clock Design Chosen By Judges For Honorable Mention

An original clock design incorporating the beauty of Lucite and Plexiglas won an Honorable Mention for Accessory Timepieces, New York City, in the Decorators' Accessories group of the Fifth Annual Modern Plastics Competition sponsored by Modern Plastics magazine.

Designed by Camlile B. Lehman, and fabricated by Swedlow Aeroplastics Corporation, Glendale, Calif., the clock is remarkable for the simplicity of line and form and the impression it gives of being suspended in a shaft of light.

The clarity and brilliance of the plastic are not dimmed by an elaborate design, rather the whole treatment represents a beautiful and sympathetic handling of the plastic. Full advantage was taken of the material in showing the clock move-



ment, a fine, 11-jewel Seth Thomas. The simple gold face adds to the richness of the crystal-clear plastic.

Formal announcement of all awards for entries in the Competition will be made in the October issue of Modern Plastics magazine, followed by a Presentation Dinner at the Waldorf-Astoria Hotel, New York City, on October 15th.

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Over Twenty Five Million American Time Pieces In One Year

Time marches on to the ticking of more than 15 million clocks and 10 million watches manufactured in the United States in 1939 according to a preliminary report of the 1939 Census of Manufactures just issued by the Bureau of the Census.

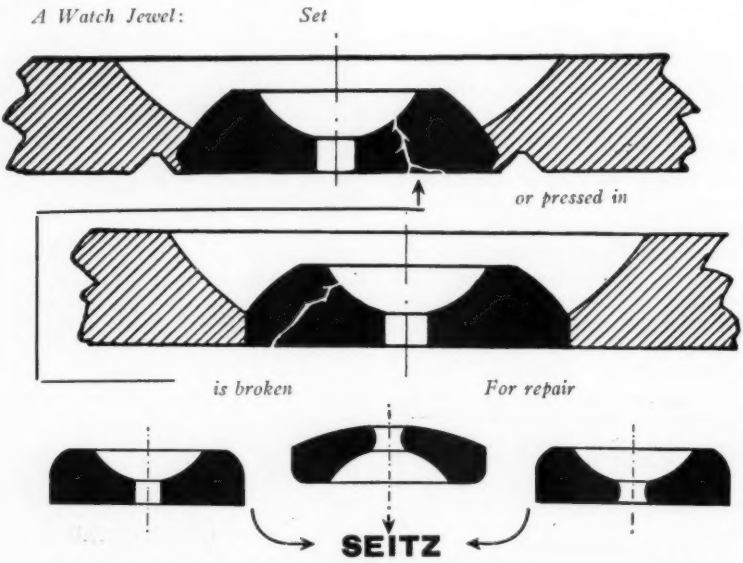
The total factory value of all products (except watch cases) of American factories producing clocks, watches, and materials and parts was reported at $84,846,136 in 1939 as compared to $97,933,776 in 1937.

The total number of complete clocks produced for use as timepieces only was reported at 15,914,030 with a factory value of $22,869,681. This total included 10,070,666 alarm clocks, 3,957,336 electric clocks, and other clocks of various kinds to the number of 1,886,028. In addition, clock movements, made for sale separately, produced in 1939 numbered 1,324,234.

By far the greatest number of watches produced was in the field of the cheap non-jeweled, "dollar watch", type with 8,895,539 watches complete with cases valued by the factories at $7,597,136. This was a decline, however, of nearly two million watches of this kind from the production of 1937 when a total of 11,876,500 watches was reported with a factory value of $10,395,029.

A total number of 4,084,863 jeweled watches and jeweled movements produced for sale separately is reported for 1939. The factory value of these jeweled watches and jeweled movements was reported at $43,104,233. In 1937, the industry produced 4,900,232 jeweled watches and movements valued a $50,148,059.

Coincident with the moderate decline in production for 1939 as compared with 1937, the clock and watch



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manufacturers also reported moderate decreases in employment and wages.

The wage earners primarily engaged in manufacturing in this industry in 1939, numbered 17,878, a decrease of 23 percent compared with 23,223 reported for 1937, and their wages, $20,467,333, were less than the 1937 figure $27,558,699, by 25.7 percent. These decreases may be partially accounted for by the fact that the 1939 Census of Manufactures questionnaire, for the first time, called for personnel employed in distribution, construction, etc., separately from the manufacturing employees of the plants. It is not known how many of the wage earners reported for 1937 were engaged in distribution and construction and how many were engaged in manufacturing. Employees of the plants reported as engaged in distribution and construction activities in 1939 are not included in this preliminary report but will be included in the final report.

This industry, as constituted for census purposes, embraces establishments primarily in the manufacture of clocks (including electrical), watches, clockwork operated devices, and materials and parts, except watch-cases. It also includes establishments engaged in the assembling of watches and clocks from purchased movements and purchased cases, for which statistics cannot be shown separately.

Wedding Bells, Old and New. Milwaukee District Guild

Mr. and Mrs. Mac B. Guretzke observed their 28th wedding Anniversary on Sept. 19th. A group of their friends staged a surprise party on them. Mr. Guretzke is watchmaker for Bloedels Inc.

On September 28th occurred the marriage of Mr. Wm. C. Schumann to Henrietta A. Sawinski. Mr. Schumann is an apprentice with The Joe Wellstein Jewelry Store.

Our Technical Director, Mr. E. C. Schattschneider and wife observed their 27th Wedding Anniversary on October 15th.

On October 5th, Wedding vows were exchanged by Arthur J. Friedrich and Miss Dorothy Hunkel. Mr. Frederick is employed as a watchmaker by Joe Goldman Inc.

On October 12th occurred the marriage of Rudolph J. Burgstaller to Miss Evelyn M. Winkler. Jr. Burgstaller owns and operates a repair shop in the Manhattan Building.

All the above mentioned gentlemen are members of The Milwaukee District Guild and we offer our congratulations and best wishes.

Worcester and Worcester County Guild No. 2

October 7, our guild held its regular meeting and discussed the action taken by the third annual meeting of the Horological Association of Massachusetts.

Among the foremost topics was that of the presentation of the state bill at the next legislation for licensing watchmakers in the State of Massachusetts.

J. Edward Bogage, national trustee, gave a report on the state convention, held October 6. The ladies auxiliary of our guild were in attendance, as well as members of the Fitchburg and Leominster Guild. The auxiliary will hold a Hallowe'en party at the Hotel Aurora at a date to be announced.

Winfred D. Hebert, president, presided.

J. Edward Bogage, Secy.

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Watch Position Testing Machine

By Mr. James A. Esser, Inventor

With the increased interest in proving one's proficiency, watchmakers of America continue to strive for a higher attainment, and in so doing are continually endeavoring to create new devices to further their proficiency and service to the consuming public.

JAMES A. ESSER, Inventor

Mr. James A. Esser, inventor of this Watch Position Testing Machine, gives us another mechanical aid. The machine, overall, is 8 inches by 6¼ by 3¾ inches, solid brass, holds 8 watches, their tags and bands. The instrument is powered by a 3 watt, 600 R.P.M.-110 Volt, 60 cycle motor, finished in platinum grey.

This instrument in continuous operation costs you 12c a month for current; there is a slip clutch in the motor allowing the flanges to be turned forward or backward to put on or take off watches. The price of this instrument is $9.75 net.

The idea of the device is to test watches in all positions. All watches placed on the machine are slowly moved through almost every position; in 2½ hours every watch has actually passed through 9,000 different positions.

If there is any disturbing factor in the watch causing the motion to be poor in any position, the machine will either throw the watch off time or stop it. Or any watch that will keep time on the machine may be delivered to the customer with the assurance that it is in good condition in every position.

Like most new devices the watchmaker must learn to use it to get the best results for his particular needs.

It has been found that where a watchmaker uses the machine for a period of time he will find it almost indispensable, and that it will show up defects in about 15 to 20% of the watches tested, and that these defects may be adjusted before the customer receives the job, thereby cut down on comebacks.

The instrument also has good advertising value, in that it shows the customer that the repairman is using every means to insure them the best of work.

Rome, Georgia Guild of U. H. A.

Through the splendid cooperation of Mr. J. H. Reed, Executive Secretary of the Georgia Retail Jewelers Association, and the newly created Atlanta Guild, another guild has already been established in Rome, Georgia. The temporary appointed president is Mr. Henry D. Getz.

This guild also promises to be a powerful factor in the Jewelry and Horological industry of Georgia.

Albuquerque, New Mexico Watchmakers Guild Formed As U. H. A. A. Unit

The Albuquerque Guild promises to be the forerunner of a strong state association in New Mexico, with the following officers heading this organization:

President—J. G. Hoyler
Vice-Pres.—Ira Crawford
Secy-treas.—R. S. Nordeen

Tennessee Becomes U. H. A. A. Affiliate

The Tennessee Watchmakers and Jewelers Association became an aux-

iliary of U. H. A. A. at their recent meeting of state board of directors, Nashville, October 6, 1940.

Tennessee went on record that all horological associations should move, unifying national efforts, bringing about coordination of thought, and the strengthening of our cause for this common end in a national way.

We truly welcome the State of Tennessee to our ranks.

This association is officered by:

President — S. George Cochron, Nashville.

Vice-Presidents—John B. Varallo, Nashville; George R. Harding, Chattanooga; B. A. Ruwe, Knoxville; J. B. McQuirter, Memphis.

Secy-treas.—Ralph F. Langreck, Nashville.

Atlanta Georgia Guild Of U. H. A. A.

Under the direction of the National office and the personal supervision of Mr. J. H. Reed, Executive Secretary of the Georgia Retail Jewelers Association, the Atlanta Guild has been permanently established, accepted their by-laws, and now prepare for a vigorous campaign for the balance of the state. The following officers head the guild:

President—Harley Strong

Vice Pres.—A. L. Bair

Secy-treas.—Frank Beasley

Mr. Bair and Mr. Ralph Currier to act on Board of Directors.

Educational Committee: A. L. Bair, Carl Harris, and B. J. Burt.

Northern Indiana Watchmakers Guild

Held their annual fish fry, which was attended by 70 watchmakers.

Mr. Fred Lund of Chicago was the principal speaker and gave an interesting talk on "Professionalizing the Watchmaking Industry." Mr. Herman Lodde, state managing director, also addressed the group, in behalf of the association's work on the state board.

New Elgin Sales Promotion

Marking the climax of one of the most complete and colorful dealer sales promotion programs of recent years is the new Christmas advertising portfolio just released by the Elgin National Watch Company.

The portfolio, traditionally Christmas in its coloring, shows a notable departure from the conventional in its unusual treatment of the complete advertising set-up presented by Elgin for the holiday season.

This advertising program comprises everything from huge twenty-four sheet billboard posters showing Uncle Sam and Santa Claus and featuring the holiday theme of a real American Christmas, to extensive newspaper and magazine advertisements. The posters are a new departure for Christmas sales on Elgin's part. They are prepared for display over the local jeweler's name and address. The whole program has been arranged in typical holiday spirit and is directed at what may prove to be one of the greatest Christmas sales seasons in many years. With the improved outlook for business generally in this country, it is anticipated that jewelers will enjoy an exceptionally prosperous sales period at this time.

Cincinnati Guild

The October 4th meeting of the Cincinnati Guild was very interesting.

Mr. Fritz Mende gave a very interesting talk and demonstration on Polishing Pivots.

The annual dance of the guild will be held January 11, 1941 at Hotel Sinton. Mr. Fritz Mende, chairman.

Mr. Richard Aukenthaler reported on the annual picnic, held September 15, and which was a success.

Starting with our next meeting, the National Educational Program will be inaugerated and followed through.

Legislative work is being vigorously pushed forward.

Election of officers for the ensuing year was as follows:

President—Elmer G. Kaising

Vice-President—Elmer G. Fisher

Secretary-Treasurer—Rudy Flaxmayer.

Recording Secretary—Bill Grogan

Corres. Secretary—Frank Flynn

Serg. at Arms—Al. Kappes

Executive Board—R. Aukenthaler for one year.

Executive Board—Bill Funk and H. Flotemersch for three years.

Elmer G. Fisher

Horological Association Of Massachusetts

Third Annual Meeting

The state convention was held at Worcester, Massachusetts, October 6, 1940.

Henry C. Desjardins of Beverly was reelected president. Other officers elected were:

Winfred D. Hebert, Vice-President, Worcester.

Col. Wm. H. Bright, Secretary, Waltham.

Paul C. Tasse, Treasurer.

J. Edward Bogage, national trustee, Worcester.

Joseph Richard of Lowell and J. Fillebrown of Boston were elected for a three year term to the Executive Committee.

Six guilds were represented, with a heavy registration. The guilds represented were: Worcester County, Merrimac Valley, South Shore, North Shore, Boston, and Hamden.

At the banquet, which followed the meeting, Col. Bright spoke on registration of watchmakers with the government for preparedness work. Mr. J. Blain Libby of Milford was named chairman of the committee to submit their bill to the legislature.

Col. Wm. H. Bright, Secy.

Wabash Valley Watchmakers Guild

The guild held its second annual picnic outing in September, at a popular park in Terre Haute.

155 prizes and favors were given to the 80 odd watchmakers and their wives attendings.

FRANK KAUFFMANN
1485 Third Ave., New York, N. Y.
IMPORTER
of world-famous hand-carved
CUCKOO CLOCKS
and Parts; also Movements for Grandfather Clocks
Ask for Latest Price List

St. Joseph Valley Watchmakers Guild

Held their first anniversary banquet at the Morningside Hotel, South Bend, Indiana.

A demonstration of the new Paulson timer was given, after which there was entertainment.

Indianapolis Association Of Watchmakers

At their meeting in October, the association members enjoyed the demonstration of a moveable regulator rack, made by Mr. J. A. Esser. Mr. William I. Renn gave a two hour exhibition of his technicolor films, showing the beauty of an automobile trip he and Mrs. Renn made to the western coast.

The meeting was well attended and the organization is planning many beneficial and educational meetings for the future.

Roy Chiles, President.

Western Minnesota Guild

This guild was formulated September 21—a new addition to the already strong Minnesota Master Watchmakers Association.

The guild is headed by Mr. Jos. W. Felix, president and Mr. Oscar Welander, secretary, Fergus Falls, Minnesota.

This guild promises to be the forerunner of a real large guild in the western section.

Minnesota Master Watchmakers Association Annual Meeting

The annual state meeting of the state association will be held at St. Paul Hotel, St. Paul, Minnesota, Sunday, November 3. The guest speaker Mr. B. W. Heald of Wisconsin, who is chairman of U. H. A. A. Executive Committee. Minnesota is definitely going to present their legislative bill for licensing in 1941.

Southwest Missouri Watchmakers Guild

Held its regular meeting in September at the Chamber of Commerce, in Springfield, Missouri, at which time Mr. Raymond Zerr acted at temporary chairman.

Officers elected for the ensuing year were:

President—Lloyd Kavanaugh
Vice-President—Floyd Underwood
Secretary—Raymond Zerr
Treasurer—Floyd Pruitt

The Board of Directors as follows: W. R. Hastings, Joplin; Tony Drachenberg, Webb City; Chas. R. Percival, Thayer; Archie Wharton, Aurora, J. B. Hauber, Mountain Grove.

This guild promises to be one of the strongest in the state of Missouri. We wish them well.

Tulsa Guild No. 3

Held their regular meeting in September with an attendance in excess of fifty people.

The guest speaker of the evening was Mr. Odjers, who is associated with Spartan School of Aeronautics in Tulsa. Mr. Odjers gave a very interesting lecture on instruments in conjunction with their regular instrument course.

Central Missouri Horological Guild

Holding their meetings regularly, have noted a decided increase at each meeting. This guild's technical program will prove to be exceptionally interesting to all, under the direction of Mr. A. R. Jones. The next meeting will be held November 19.

Clinton Holt, Secy.

Chicago Horological Guild

The guild held its annual dinner meeting during the month of October, which was a tremendous success.

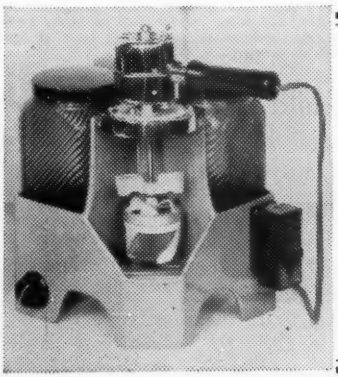
All meetings of our guild have been improving each meeting night. The watchmakers and readers of THE AMERICAN HOROLOGIST, in the vicinity of Chicago Guild, should contact secretary Ander, 3004 North Cicero Avenue, Chicago, Illinois, and attend these uplifting meetings.

Akron Horological Guild

Will hold their annual election in November, in order to conform with the national government policy of holding their election at that period.

Our last meeting, October 15, we enjoyed a short talk by Dr. D. B. Moore on the big forth-coming economic change and its relation to the watchmaker.

M. Walker



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All the name implies

New Feature—
Automatic cut off on the drying unit

PRICE - $35.00

$3.50 per month for 10 months

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Wholesale Jewelers Supplies

U. H. A. A. Vice-President, Col. Wm. H. Bright Appears Before Eastern Guild

Col. Bright appeared before the Albany District Guild and Mohawk Valley Guild on the 14th and 15th of October respectively, speaking in behalf of the strengthening of those organizations and the broadening of their fields of endeavor.

Col. Bright also spent a pleasant day with the New York Student Guild in Morrisville, New York.

Robert G. Taylor.

Horological Society Of New York

Held their October meeting October 1 at the Engineering Societies Building, New York City.

Mr. Andrew Park opened the meeting with the announcement concerning the plans for the society's annual dinner-banquet to be held on Washington's birthday, February 22, 1941, at the Cocoanut grove of the Park Central Hotel. Price of tickets have been tentatively set at $3.00 each. Mr. J. L. Roerich, president of the New York State Watchmaker's association, spoke on plans being formulated for State convention.

Mr. H. B. Fried, secretary, announced Mr. Samelius may visit the society for the purpose of delivering a lecture.

At an executive meeting held on October 15, the night before the National Registration for Selective Service, it was voted to exempt any member from the payment of dues who may be called for service. The members so drafted into service shall receive all the benefits due to paid up members. This motion was unanimously carried.

The next meeting will take place on the night of National Election, November 16, at the Engineering Societies building.

Henry B. Fried

Elgin Schools in Movies

A new first in the educational film field is the motion picture of the science of watchmaking filmed at the Elgin Watchmakers' College by Coronet Production, Inc., educational and commercial film firm.

Coronet Productions is the newest venture of David A. Smart, well known publisher of ESQUIRE and other magazines. who has entered the motion picture field to fulfill a long-felt need for better understanding of the country's basic vocations, industries, and agricultural developments. The producers, after consulting several prominent educational advisers, obtained permission to make this picture of the watchmakers' trade as one of their initial projects.

Worlds Fair Observatory Moved To Elgin

When the Fair closed its doors for the last time on October 26, all of the material from the Elgin Watch Observatory on the grounds was crated and shipped to the firm's home office at the factory in Elgin, Illinois. Numerous other pieces are to be added, and the whole will be assembled into one of the most authentic portrayals of the development of timekeeping apparatus through the ages.

First of all, there are the eight large mural paintings by Kipp Soldwedel, noted New York artist, showing the evolution from pre-historic time, through water and sun clocks, to mediaeval "glocken" or bell clocks. Then, there is a complete collection, probably unique in the world, of models of various early timekeeping devices. These include the caveman's piece of knotted rope which, burning slowly from knot to knot, marked off the passage of certain periods of time; a battery of mounted sand glasses used in the fourteenth century to measure quarters of hours; segmented candles which burned from one mark to another in an hour; and an oil lamp in which the oil burned down between markings during a specified interval of time.

Elgin's collection of timepieces contain examples of almost every type of clock and watch movements since they were first invented. Numerous elaborate and unusual varieties are among the rare timepieces.

Then, of course, there are displays of the most modern timepieces, and working models showing the principles of physics employed in today's measuremeent of time in terms of split seconds.

The tremendous interest in the exhibit as it was displayed at the World's Fair was responsible for the decision to gather together some sort of permanent collection of timekeeping museum pieces.

The exhibit will now be preserved for posterity and the public will have opportunity to study and understand the mechanics of keeping one of its most treasured possessions, TIME.

Swartchild Distributes Material Publication

Frequently Swartchild and Co. sends to the entire trade a complimentary publication which is of unlimited value in the daily tasks of the man at the bench.

During the summer, for example, this large material firm sent, free of charge, a 28-page Mainspring Table to every watchmaker in the country.

The early November mails will contain another free Swartchild book—a 24-page Swiss Guide and Index of inestimable value to the watchmaker. It contains illustrations of a carefully selected group of the latest and most modern Swiss movements—also an illustration of each setting bridge, each manufacturer's trade mark, and the proper stock number of mainspring to order for each movement.

In addition to this valuable information ,there is a several-page index of the most complete Swiss Watch Name list ever compiled.

Swartchild & Co. asks the watchmakers of the country to accept this free book with its compliments.

Any watchmaker not receiving a copy, or wishing additional copies should write direct to Swartchild & Co. either in Chicago or to the closest one of its branches.

New Waltham Premier

In the new 1941 line of Waltham Premier watches, the Waltham Watch Company has made several important contributions to the American watch industry which it founded in 1849. These outstanding features are resulting in a greatly increased demand for Waltham Premier watches.

Never before has there been an American 21 jeweled women's wrist watch! Now Waltham offers three 21 jeweled watches for women retailing at $45 and $60.

Waltham also announced an American-made waterproof watch appropriately called the "Submarine." Furnished in both men's and women's models, the "Submarine" sells for $29.75 with 9 jewels, chrome bezel and non-corrosive back, and $39.75 with 17 jewels, gold-filled bezel and non-corrosive back. All have unbreakable crystals and waterproof straps. Not only is the "Submarine" ideal for sportswear but, being the only American waterproof watch, it is particularly suited for men entering military service. Alert jewelers will be quick to take advantage of this vast new market.

In the "Hubbard" Waltham has succeeded in creating one of the finest presentation watches in America. Retailing for $100 in a 14K red or yellow ultra thin gold case with a 21 jeweled movement, the "Hubbard" has 13 rubies or sapphires (as you prefer) mounted in gold on the dial indicating the hours.

Other features include a new thin model pocket watch, the "Topsfield," and a Nun's watch, several sweep second watches and, for the man who wants a novelty, a gold cuff link watch.

Many watches have been made available in the increasingly popular red gold.

The Waltham Watch Company emphasizes the fact that the prices of its watches are under the protection of the Fair Trade Laws.

War Department Allauds Bausch & Lomb Co.

Defending its 87-year old record on national defense, the Bausch & Lomb Optical Co., Rochester, N. Y., largest maker of military optical instruments issued a book today containing laudatory letters from Secretaries Stimson and Knox of the War and Navy Departments. It refutes attacks on the company's loyalty and patriotism engendered by the indictment which charged restraint of trade in military instruments.

Stimson said, "The relations between Bausch & Lomb and the War Department, extending over a long period of years, have been most satisfactory from every standpoint. At this critical time, the War Department has complete confidence in your company for excellence of workmanship, production ability and patriotic cooperation."

THE CASE OF THE AMBITIOUS JEWLER

He shouted too loud when he offered to test watches free. But, how could he have known that so many would accept the offer—and then decide to have their watches repaired or else buy new ones? And all of this, just because there was no disputing the printed test records. Well, that's the consequence of having a——

Watch Master

Diagnoses watch troubles and prints the 24 hour rate, all in 30 seconds.

Increases patronage, cuts watch-repair time. Tests new watches for stock.

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